

II. RESEARCH SUBSTANCE

ABSTRACT

Biomass based of activated carbon electrodes of EC modified by depositing nano-structure metal oxide on these electrode to produce high energy and power density of EC with moderate cost. The performance of activated carbon and nano-structure metal oxide influenced by some properties of activated carbon such as surface area, pore size distribution and electrical conductivity. Wood based activated carbon monoliths (ACM) have hierarchical macro-pores structure that inherited naturally. By chemical and physical activation optimized combination of micro-pores or meso-pores on the wall of macro-pores can be done to improve the surface area of the ACM. High electrical conductivity may be found because of no needing binders in the electrode production process. High surface area with fine tunnel macro-pores, shallow meso and micro-pores to cause the simple process of the ion diffuse trough the pores of the ACM, high energy and power density of ACM electrode could be found. Improving the energy density may achieve by addition of nano-manganese oxide on the surface of macro-pores the ACM. By choosing of composite electrode materials (biomass based ACM and manganese) high energy and power density of EC with relative low price production could be achieved.